



# TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

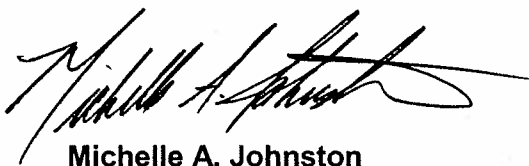
## ANALYTICAL REPORT

### Perfluorocarbon (PFC) Analysis

Lot #: D0B100546

Dena Haverland

Dalton Utilities  
1200 V.D. Parrot Jr. Parkway  
Dalton, GA 30721



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February 23, 2010

## **Case Narrative**

### **D0B100546**

TestAmerica Denver utilizes USEPA approved methods in all analytical work. The samples presented in this report were analyzed for the parameters listed on the methods summary page in accordance with the methods indicated. Dilution factors and footnotes are provided on each datasheet to assist in the interpretation of the results.

The results relate only to the samples in this report and meet all requirements of NELAC. All data have been reviewed for compliance with the laboratory QA/QC plan and have found to be compliant with laboratory protocols with any exceptions noted below.

Please note that Non-Detect (ND) results have been evaluated down to the Method Detection Limit (MDL) and should be considered ND at the MDL. Unless otherwise noted, results for solids have been dry weight corrected.

This report shall not be reproduced except in full, without the written approval of the laboratory.

#### **Sample Arrival and Receipt**

The following report contains the analytical results for four samples received at TestAmerica Denver on February 10, 2010, according to documented sample acceptance procedures. The samples were received in good condition at a temperature of 4.8°C. No anomalies were encountered during sample receipt.

#### **Standards**

Analytical standards were prepared using commercially available certified solutions containing all compounds of interest.

The mass labeled compounds 13C4 PFBA, 13C2 PFHxA, 18O2 PFHxS, 13C4 PFOA, 13C4 PFOS, 13C5 PFNA, 13C2 PFDA, 13C2 PFUnA, 13C2 PFDoA, and D3 MeFOSA were introduced at the extraction step and were used for internal standards for the quantitation of the target compounds.

#### **Sample Extraction and Analysis**

The samples presented in this report were extracted for the target analytes by TestAmerica Denver's Standard Operating Procedure (SOP) DV-OP-0019 and analyzed for the target analytes by TestAmerica Denver's SOP DV-LC-0012.

#### **Method QC Samples**

The Method Blank is processed reagent water spiked with internal standard and prepared with each batch of 20 samples of the same matrix. The method blanks were non-detect at the reporting limits for the target analytes.

Each batch is prepared with a mid level Laboratory Control Sample (LCS). The LCS recoveries were within established control limits, with the exception of the items noted in section Analytical Comments. The low-level LCS requirement changed on January 26, 2010.

#### **Analytical Comments**

Each sample is analyzed to achieve the lowest possible reporting limits within the constraints of the method. Due to matrix interference, all four samples had to be analyzed at dilutions. The reporting limits have been adjusted relative to the dilutions required. Samples I-3 and I-4 were

Lot #: D0B100546

black in color and samples E-3 and E-4 were orange in color. The laboratory noted analysis at less diluted concentrations would jeopardize the integrity of the instrument.

The organic preparation chemist had to use two cartridges to extract all four samples as the samples contained suspended solids and sediment.

The LCS/LCSD associated with QC batch 0042140 exhibited percent recoveries above the QC limits for Perfluorooctane sulfonamide (FOSA). This is an indicator that data may be biased high. As no detectable concentrations are present in the associated samples, corrective action is deemed unnecessary.

The method required MS/MSD could not be performed for QC batches 0042140 and 0042141, due to insufficient sample volume. Method precision and accuracy have been verified by the acceptable mid-level LCS/LCSD analyses data.

The closing Continuing Calibration Verification (CCV) standard associated with samples in QC batch 0042141 exhibited %D values out of range, biased high, for Perfluorotridecanoic acid (PFTrIA) and Perfluorotetradecanoic acid (PFTeA). This is an indicator that data may be biased high. As no detectable concentrations of PFTrIA and PFTeA are present in the associated samples, corrective action is deemed unnecessary.

No other anomalies were observed.

## EXECUTIVE SUMMARY - Detection Highlights

DOB100546

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
I-3 02/06/10 001				
Perfluoropentanoic acid (PFPA)	1.9	1.5	ug/L	DEN -LC-0012
Perfluorohexanoic acid (PFHxA)	1.3	1.0	ug/L	DEN -LC-0012
Perfluorobutane sulfonate (PFB)	1.3	1.0	ug/L	DEN -LC-0012
Perfluorooctanesulfonate	0.77 J	1.5	ug/L	DEN -LC-0012
Perfluorooctanoic Acid	0.77 J	1.0	ug/L	DEN -LC-0012
E-3 02/06/10 002				
Perfluoropentanoic acid (PFPA)	0.12 J	0.30	ug/L	DEN -LC-0012
Perfluorohexanoic acid (PFHxA)	0.074 J	0.20	ug/L	DEN -LC-0012
I-4 02/06/10 003				
Perfluoroheptanoic acid (PFHpA)	0.74 J	1.5	ug/L	DEN -LC-0012
Perfluoropentanoic acid (PFPA)	2.6	1.5	ug/L	DEN -LC-0012
Perfluorobutanoic acid (PFBA)	0.89 J	1.0	ug/L	DEN -LC-0012
Perfluorohexanoic acid (PFHxA)	1.5	1.0	ug/L	DEN -LC-0012
Perfluorobutane sulfonate (PFB)	8.9	1.0	ug/L	DEN -LC-0012
Perfluorooctanesulfonate	0.82 J	1.5	ug/L	DEN -LC-0012
Perfluorooctanoic Acid	1.1	1.0	ug/L	DEN -LC-0012
E-4 02/06/10 004				
Perfluoropentanoic acid (PFPA)	0.12 J	0.30	ug/L	DEN -LC-0012
Perfluorohexanoic acid (PFHxA)	0.069 J	0.20	ug/L	DEN -LC-0012
Perfluorobutane sulfonate (PFB)	0.35	0.20	ug/L	DEN -LC-0012

## METHODS SUMMARY

DOB100546

<u>PARAMETER</u>	<u>ANALYTICAL METHOD</u>	<u>PREPARATION METHOD</u>
LC/MS/MS PFCs	DEN -LC-0012	SW846 FOSA spec

### References:

DEN      TestAmerica Laboratores, Denver, Facility Standard  
Operating Procedure.

## METHOD / ANALYST SUMMARY

DOB100546

<u>ANALYTICAL METHOD</u>	<u>ANALYST</u>	<u>ANALYST ID</u>
DEN -LC-0012	Teresa L. Williams	002510

### References:

DEN      TestAmerica Laboratores, Denver, Facility Standard  
Operating Procedure.

## SAMPLE SUMMARY

DOB100546

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
LVH5J	001	I-3	02/06/10	
LVH5L	002	E-3	02/06/10	
LVH5M	003	I-4	02/06/10	
LVH5N	004	E-4	02/06/10	

### NOTE(S) :

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

**Dalton Utilities**

**Client Sample ID: I-3**

**HPLC**

Lot-Sample #....: DOB100546-001  
 Date Sampled....: 02/06/10  
 Prep Date.....: 02/11/10  
 Prep Batch #....: 0042141  
 Dilution Factor: 50

Work Order #....: LVH5J1AA  
 Date Received...: 02/10/10  
 Analysis Date...: 02/21/10  
 Analysis Time...: 17:44

Matrix.....: WATER

Method.....: DEN -LC-0012

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
Perfluoroheptanoic acid (PFHpA)	ND	1.5	ug/L	0.66
Perfluorononanoic acid (PFNA)	ND	2.0	ug/L	0.87
Perfluorododecanoic acid (PFDoA)	ND	1.5	ug/L	0.75
Perfluorotridecanoic acid (PFTriA)	ND	2.0	ug/L	0.89
Perfluorotetradecanoic acid (PFTeA)	ND	1.5	ug/L	0.73
Perfluoropentanoic acid (PFPA)	1.9	1.5	ug/L	0.55
Perfluorohexane sulfonate (PFHxS)	ND	1.5	ug/L	0.35
Perfluorobutanoic acid (PFBA)	ND	1.0	ug/L	0.49
Perfluorohexanoic acid (PFHxA)	1.3	1.0	ug/L	0.15
Perfluorodecanoic acid (PFDA)	ND	1.0	ug/L	0.39
Perfluoroundecanoic acid (PFUnA)	ND	1.0	ug/L	0.34
Perfluorobutane sulfonate (PFBS)	1.3	1.0	ug/L	0.41
Perfluorooctanesulfonate	0.77 J	1.5	ug/L	0.67
Perfluorooctanoic Acid	0.77 J	1.0	ug/L	0.49

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
13C4 PFOA	108	(60 - 155)
13C4 PFOS	99	(45 - 130)
13C4 PFBA	108	(36 - 130)
13C2 PFHxA	107	(55 - 135)
18O2 PFHxS	108	(61 - 130)
13C5 PFNA	107	(54 - 132)
13C2 PFDA	108	(53 - 130)
13C2 PFUnA	107	(37 - 130)
13C2 PFDoA	109	(26 - 130)

**NOTE(S):**

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: I-3

HPLC

Lot-Sample #....: D0B100546-001    Work Order #....: LVH5J1AC    Matrix.....: WATER  
Date Sampled....: 02/06/10    Date Received...: 02/10/10  
Prep Date.....: 02/11/10    Analysis Date...: 02/21/10  
Prep Batch #....: 0042140    Analysis Time...: 20:04  
Dilution Factor: 50  
Method.....: DEN -LC-0012

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u> <u>LIMIT</u>	<u>UNITS</u>	<u>MDL</u>
Perfluorooctane sulfonamide (F OSA)	ND	2.5	ug/L	0.29

<u>SURROGATE</u>	<u>PERCENT</u> <u>RECOVERY</u>	<u>RECOVERY</u> <u>LIMITS</u>
MeFOSA	66	(37 - 130)

**Dalton Utilities**

**Client Sample ID: E-3**

**HPLC**

<b>Lot-Sample #....:</b> DOB100546-002	<b>Work Order #....:</b> LVH5L1AA	<b>Matrix.....:</b> WATER
<b>Date Sampled....:</b> 02/06/10	<b>Date Received...:</b> 02/10/10	
<b>Prep Date.....:</b> 02/11/10	<b>Analysis Date...:</b> 02/21/10	
<b>Prep Batch #....:</b> 0042141	<b>Analysis Time...:</b> 17:59	
<b>Dilution Factor:</b> 10		
	<b>Method.....:</b> DEN -LC-0012	

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
Perfluoroheptanoic acid (PFHpA)	ND	0.30	ug/L	0.13
)				
Perfluorononanoic acid (PFNA)	ND	0.40	ug/L	0.17
Perfluorododecanoic acid (PFDoA)	ND	0.30	ug/L	0.15
)				
Perfluorotridecanoic acid (PFTriA)	ND	0.40	ug/L	0.18
Perfluorotetradecanoic acid (PFTEA)	ND	0.30	ug/L	0.15
Perfluoropentanoic acid (PFPA)	0.12 J	0.30	ug/L	0.11
Perfluorohexane sulfonate (PFHxS)	ND	0.30	ug/L	0.070
Perfluorobutanoic acid (PFBA)	ND	0.20	ug/L	0.098
Perfluorohexanoic acid (PFHxA)	0.074 J	0.20	ug/L	0.029
Perfluorodecanoic acid (PFDA)	ND	0.20	ug/L	0.078
Perfluoroundecanoic acid (PFUnA)	ND	0.20	ug/L	0.069
)				
Perfluorobutane sulfonate (PFBS)	ND	0.20	ug/L	0.082
Perfluorooctanesulfonate	ND	0.30	ug/L	0.13
Perfluorooctanoic Acid	ND	0.20	ug/L	0.098

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
13C4 PFOA	101	(60 - 155)
13C4 PFOS	95	(45 - 130)
13C4 PFBA	99	(36 - 130)
13C2 PFHxA	100	(55 - 135)
18O2 PFHxS	97	(61 - 130)
13C5 PFNA	99	(54 - 132)
13C2 PFDA	98	(53 - 130)
13C2 PFUnA	103	(37 - 130)
13C2 PFDoA	95	(26 - 130)

**NOTE (S) :**

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: E-3

HPLC

Lot-Sample #....: D0B100546-002    Work Order #....: LVH5L1AC    Matrix.....: WATER  
 Date Sampled....: 02/06/10    Date Received...: 02/10/10  
 Prep Date.....: 02/11/10    Analysis Date...: 02/21/10  
 Prep Batch #....: 0042140    Analysis Time...: 20:09  
 Dilution Factor: 10

Method.....: DEN -LC-0012

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>MDL</u>
Perfluorooctane sulfonamide (F OSA)	ND	0.50	ug/L	0.057

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
MeFOSA	85	(37 - 130)

**Dalton Utilities**

**Client Sample ID: I-4**

**HPLC**

<b>Lot-Sample #....:</b> D0B100546-003	<b>Work Order #....:</b> LVH5M1AA	<b>Matrix.....:</b> WATER
<b>Date Sampled....:</b> 02/06/10	<b>Date Received...:</b> 02/10/10	
<b>Prep Date.....:</b> 02/11/10	<b>Analysis Date...:</b> 02/21/10	
<b>Prep Batch #....:</b> 0042141	<b>Analysis Time...:</b> 18:14	
<b>Dilution Factor:</b> 50		
	<b>Method.....:</b> DEN -LC-0012	

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
Perfluoroheptanoic acid (PFHpA)	0.74 J	1.5	ug/L	0.66
Perfluorononanoic acid (PFNA)	ND	2.0	ug/L	0.87
Perfluorododecanoic acid (PFDoA)	ND	1.5	ug/L	0.75
Perfluorotridecanoic acid (PFTriA)	ND	2.0	ug/L	0.89
Perfluorotetradecanoic acid (PFTeA)	ND	1.5	ug/L	0.73
Perfluoropentanoic acid (PFPA)	2.6	1.5	ug/L	0.55
Perfluorohexane sulfonate (PFHxS)	ND	1.5	ug/L	0.35
Perfluorobutanoic acid (PFBA)	0.89 J	1.0	ug/L	0.49
Perfluorohexanoic acid (PFHxA)	1.5	1.0	ug/L	0.15
Perfluorodecanoic acid (PFDA)	ND	1.0	ug/L	0.39
Perfluoroundecanoic acid (PFUnA)	ND	1.0	ug/L	0.34
Perfluorobutane sulfonate (PFBS)	8.9	1.0	ug/L	0.41
Perfluorooctanesulfonate	0.82 J	1.5	ug/L	0.67
Perfluorooctanoic Acid	1.1	1.0	ug/L	0.49

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
13C4 PFOA	85	(60 - 155)
13C4 PFOS	73	(45 - 130)
13C4 PFBA	81	(36 - 130)
13C2 PFHxA	82	(55 - 135)
18O2 PFHxS	84	(61 - 130)
13C5 PFNA	79	(54 - 132)
13C2 PFDA	80	(53 - 130)
13C2 PFUnA	84	(37 - 130)
13C2 PFDoA	76	(26 - 130)

**NOTE(S) :**

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: I-4

HPLC

Lot-Sample #....: DOB100546-003    Work Order #....: LVH5M1AC    Matrix.....: WATER  
Date Sampled....: 02/06/10    Date Received...: 02/10/10  
Prep Date.....: 02/11/10    Analysis Date...: 02/21/10  
Prep Batch #....: 0042140    Analysis Time...: 20:14  
Dilution Factor: 50  
Method.....: DEN -LC-0012

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u> <u>LIMIT</u>	<u>UNITS</u>	<u>MDL</u>
Perfluorooctane sulfonamide (F OSA)	ND	2.5	ug/L	0.29

<u>SURROGATE</u>	<u>PERCENT</u> <u>RECOVERY</u>	<u>RECOVERY</u> <u>LIMITS</u>
MeFOSA	69	(37 - 130)

**Dalton Utilities**

**Client Sample ID: E-4**

**HPLC**

<b>Lot-Sample #....:</b> D0B100546-004	<b>Work Order #....:</b> LVH5N1AA	<b>Matrix.....:</b> WATER
<b>Date Sampled....:</b> 02/06/10	<b>Date Received...:</b> 02/10/10	
<b>Prep Date.....:</b> 02/11/10	<b>Analysis Date...:</b> 02/21/10	
<b>Prep Batch #....:</b> 0042141	<b>Analysis Time...:</b> 18:29	
<b>Dilution Factor:</b> 10		
<b>Method.....:</b> DEN -LC-0012		

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
Perfluoroheptanoic acid (PFHpA)	ND	0.30	ug/L	0.13
Perfluorononanoic acid (PFNA)	ND	0.40	ug/L	0.17
Perfluorododecanoic acid (PFDoA)	ND	0.30	ug/L	0.15
Perfluorotridecanoic acid (PFTriA)	ND	0.40	ug/L	0.18
Perfluorotetradecanoic acid (PFTeA)	ND	0.30	ug/L	0.15
Perfluoropentanoic acid (PFPA)	0.12 J	0.30	ug/L	0.11
Perfluorohexane sulfonate (PFHxS)	ND	0.30	ug/L	0.070
Perfluorobutanoic acid (PFBA)	ND	0.20	ug/L	0.098
Perfluorohexanoic acid (PFHxA)	0.069 J	0.20	ug/L	0.029
Perfluorodecanoic acid (PFDA)	ND	0.20	ug/L	0.078
Perfluoroundecanoic acid (PFUnA)	ND	0.20	ug/L	0.069
Perfluorobutane sulfonate (PFBS)	0.35	0.20	ug/L	0.082
Perfluorooctanesulfonate	ND	0.30	ug/L	0.13
Perfluorooctanoic Acid	ND	0.20	ug/L	0.098

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
13C4 PFOA	104	(60 - 155)
13C4 PFOS	92	(45 - 130)
13C4 PFBA	96	(36 - 130)
13C2 PFHxA	95	(55 - 135)
18O2 PFHxS	97	(61 - 130)
13C5 PFNA	94	(54 - 132)
13C2 PFDA	95	(53 - 130)
13C2 PFUnA	102	(37 - 130)
13C2 PFDoA	101	(26 - 130)

**NOTE(S) :**

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: E-4

HPLC

Lot-Sample #....: D0B100546-004    Work Order #....: LVH5N1AC    Matrix.....: WATER  
Date Sampled....: 02/06/10    Date Received...: 02/10/10  
Prep Date.....: 02/11/10    Analysis Date...: 02/21/10  
Prep Batch #....: 0042140    Analysis Time...: 20:19  
Dilution Factor: 10

Method.....: DEN -LC-0012

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u> <u>LIMIT</u>	<u>UNITS</u>	<u>MDL</u>
Perfluorooctane sulfonamide (F OSA)	ND	0.50	ug/L	0.057

<u>SURROGATE</u>	<u>PERCENT</u> <u>RECOVERY</u>	<u>RECOVERY</u> <u>LIMITS</u>
MeFOSA	89	(37 - 130)